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| **Activity 3.1.2 Concept Development** |

Introduction

Rarely does the first solution idea develop into a superior final solution. The best solutions often result after generating a large number of design ideas and then using the design specification to systematically select several of the most promising design ideas for further investigation.

In order to evaluate the relative merit of alternate ideas, each design concept must be developed to a point at which its characteristics can be compared to the characteristics of other ideas and existing products. In order to communicate the features and function of a design idea, designers commonly create a product concept document that includes a visual representation of the idea (such as a sketch or 3D model) and a written description.

In this activity your team will select several promising ideas that resulted from your brainstorming efforts. You will then further develop each of the selected ideas and document each product concept.

Equipment

* Engineering notebook
* Concept Development presentation
* Product Concept template
* Concept Development Rubric

Procedure

1. Review the design specification for your project.
2. Gather all of the documentation created for your team’s brainstorming efforts and review the design ideas that were generated.
3. Add any additional ideas that team members may have generated since the brainstorming session(s) and consider altering or combining documented ideas to create better concepts.
4. As a team, select *at least* five (but not less than twice the number of team members in your group) of the most promising ideas from the concepts generated for further development. Document and justify your choices in your engineering notebook.
5. Assign each of the selected concepts to a team member.
6. For each assigned concept, perform additional research as necessary and refine the concept idea. Create a product concept document to include an annotated sketch using the Product Concept template. Be sure to include preliminary ideas about general size and shape, materials, and other product features that will be incorporated to address the design specification requirements. Note that each team member should be responsible for creating concept documentation for at least two different concept ideas. Insert your work into your engineering notebook.

**Conclusion**

1. Why is the design specification important when narrowing your choices of potential solutions?
2. What advantages does the use of a sketch have over verbal communication when explaining a design concept?
3. Why should you develop and refine multiple concepts before selecting a final solution?